

Winter
2008/2009

News from Gerry E. Studds
Stellwagen Bank National
Marine Sanctuary



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The Endangered “Wolf”?



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Cover Photo Credit:

Wolffish in the sanctuary
by Peter Auster and Paul Donaldson
National Undersea Research Center-UConn

Who's Afraid of the Big, Bad Wolf(fish)?

The question may not truly be "who's afraid of" but "should we be afraid for" the big, bad wolffish. This fearsome-looking creature, with large teeth and eel-like body, lurks among boulders on the seafloor. But widespread destruction of its principal habitat areas, along with years of overharvesting, may threaten this fish with extinction. A recent scientific petition from the Conservation Law Foundation and others to the federal government seeks endangered species protection for the Atlantic wolffish. If the petition succeeds, it will lead to the placement of this first New England marine fish on the endangered list.

Stellwagen Bank National Marine Sanctuary has great interest in this initiative. Not only does the sanctuary provide substantial habitat for this species, but the wolffish's image has become a symbol for the sanctuary. No sweet, cuddly animal for us – rather, the blue-gray striped, fanged fish that chomps on clams, sea urchins and crabs has become our "poster child." Historically, charter and party boat captains alike have sought this groundfish in sanctuary waters, making the wolffish one of the top-10 catches for recreational fishermen.

Although the wolffish has gained popularity as both a recreational and commercial catch, this fish has no directed fishery management plan. The dramatic decline in commercial landings regionally (95% between 1983 and 2007) has raised red flags. The wolffish was one of seven fish species in the sanctuary included on the Species of Concern List for the Endangered Species Act (a status that does not include conservation strategies). If added to the endangered list, the government must implement a plan to protect and restore the species and its habitat.

The National Marine Fisheries Service will review the petition, a process that may take more than a year with periods for public comment. For more information about the CLF petition, visit the organization's Web site at www.clf.org/wolffish. ■

Atlantic Wolffish Fast Facts

Common Name: Atlantic wolffish

Scientific Name: *Anarhichas lupus*

Other Names: Ocean catfish,
Ocean whitefish

Predators: Humans, gray seal, sea
raven (when small – red hake, cod,
haddock, goosefish, skates, spiny
dogfish)

Prey: Crustaceans (crabs, shrimps),
mollusks (scallops, clams, mussels,
snails), echinoderms (sea urchins,
sea stars, brittle stars, sand dollars)

Size: 1m (1.5m max)

Weight: 18kg (23.58 max)

Length: 98cm (age 22)

Age of Maturity in GOM: 6 years

Lifespan: 20 years or more

Interesting Information:

- Teeth shed and replaced annually; large conical canine tusks; rounded back molars; hard plates of rounded crushing teeth in upper palate and lower mouth.
- Generally solitary, but forms male-female pairs in spring.
- Extremely large eggs, prolonged incubation, and male egg brooding behavior at nests hidden under rocks and boulders.

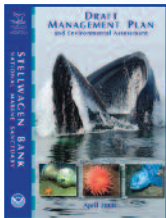
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Publications

To obtain free copies of the sanctuary publications, *Stellwagen Banknotes* (1-2 times per year) and *Stellwagen Soundings* (summer only), please contact the sanctuary via phone at 781-545-8026, ext. 201, by fax at 781-545-8036 or by e-mail at stellwagen@noaa.gov. If you would prefer to receive the publications electronically, please forward that interest and your e-mail address via any of the previously mentioned avenues. Please let us know if you would like us to forward your contact information on to the sanctuary friends' group Stellwagen Alive and to the national nonprofit National Marine Sanctuary Foundation. The sanctuary protects all personal information and will not distribute contact data outside of NOAA.



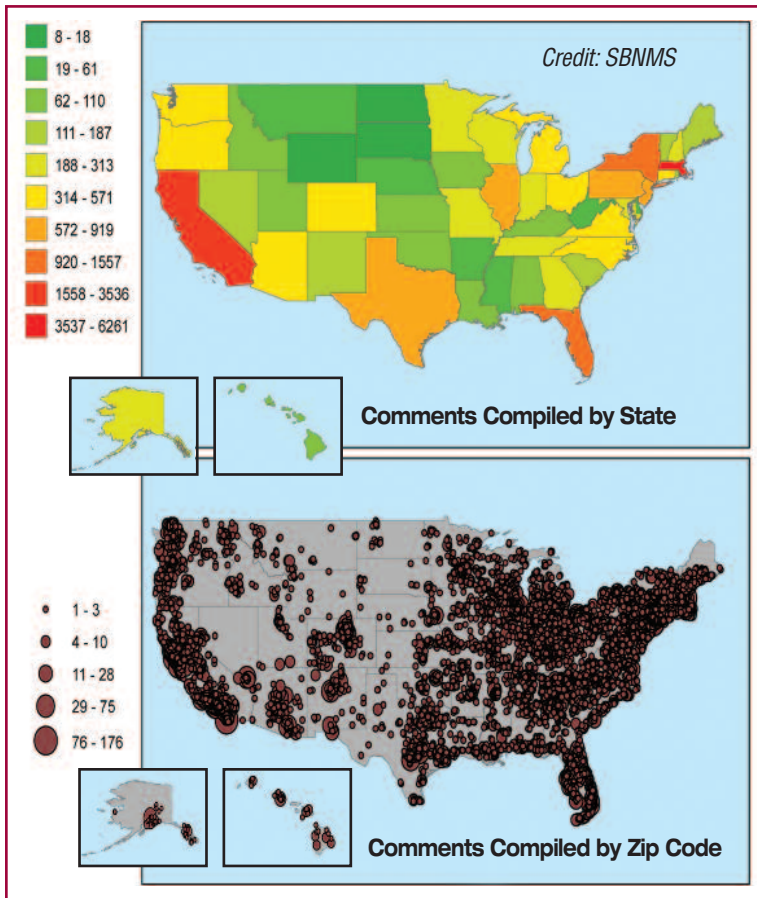
Sanctuary Attracts Widespread National Response to Draft Management Plan

Despite a difficult (and spell) name, Stellwagen Bank National Marine Sanctuary can lay claim to a dedicated and vocal band of supporters and concerned citizens. The May release of our draft management plan attracted great interest, and generated a mountain of responses. More than 24,000 comments were received at the sanctuary during the open comment period, which stretched from May 6 to October 3, 2008.

Comments came from all 50 states, two territories (Puerto Rico, Virgin Islands), and 46 foreign nations, including the United Kingdom, Dominican Republic, Australia, Serbia, Indonesia, Jamaica, Netherlands and Brazil. Although the greatest concentration of responses came from Massachusetts, several other areas showed high levels of interest, including California (where there are four other national marine sanctuaries), New York, Florida and

Texas, followed closely by Illinois, Pennsylvania, New Jersey, Ohio and Washington. Hundreds of comments generated in Minnesota, Arizona and Colorado indicate that interest in our national marine sanctuaries and the health of ocean is not just a coastal issue but concerns all Americans. The sanctuary has posted all official comments on our Web site, stellwagen.noaa.gov.

Stellwagen Bank National Marine Sanctuary staff members are now reading all of the correspondence and summarizing the comments. Upon completion of the review process, the management plan team will refine the plan, incorporating new information and making changes as needed. Official NOAA responses to each identified issue will appear in the final management plan along with a copy of each comment. Expected release date for the final management plan is mid-to-late 2009.



Automatic Identification System Adds Right Whale Alerts

The Automatic Identification System (AIS) is intended to reduce the risk of collisions between ships. But recently, sanctuary scientists realized it could play another important role – whale conservation. Not only can ship traffic in whale foraging areas be quantified, but new capabilities allow the system to transmit immediate warning notices to ships about locations of endangered right whales.

The U.S. Coast Guard, tasked with ensuring vessel safety and national security, has deployed the first phase of a nationwide surveillance system to monitor the movements of vessels at sea. AIS relies upon global positioning systems, shipboard sensors and digital VHF radio communication equipment. This internationally agreed maritime navigation safety technology allows a quick, voiceless exchange of navigation information among vessels and shoreside authorities.

AIS transmits information about a ship, including name, call sign, type, draft, cargo, destination, and estimated time of arrival. Signals are received at antennae located along the coast and relayed to a processing center. The data are

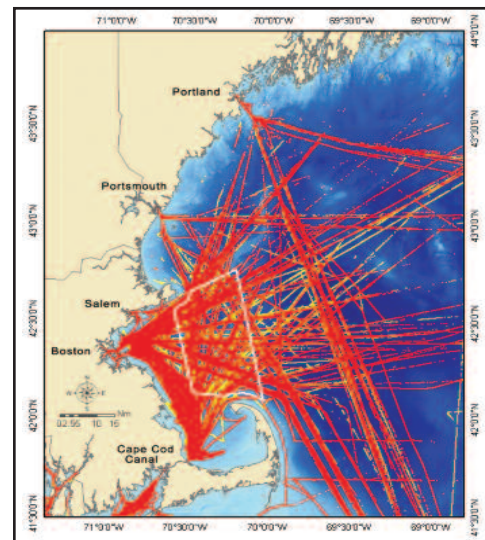
used to develop a detailed real-time view of ship traffic in the region. Knowing who is out there and exactly where they are located facilitates communication between vessels and helps prevent mishaps. The system also heightens awareness of vessels approaching U.S. ports and other sensitive areas.

The sanctuary and the U.S. Coast Guard were instrumental in making this system work successfully in the Boston region by installing an AIS signal tower at our Scituate building, and working with the Cape Cod National Seashore's Provincelands Visitor Center and Halibut Point State Park in Rockport for similar installations at their sites. To increase public understanding of the system, the sanctuary is developing AIS exhibits for both locations.

Successful implementation of AIS in the Massachusetts Bay area proved invaluable to the sanctuary by giving us a better understanding of year-round vessel use without having to go out on the water. AIS data were also instrumental in supporting the sanctuary's call for a shift in the Boston shipping lanes to an area with a lower density of whales.

NOAA researchers working with the U.S. Coast Guard discovered that this system could be adapted for another purpose – broadcasting whale alerts. When endangered right whales are

located by either sight (boat or plane observations) or sound (acoustic buoys in the shipping lanes), immediate notices can be sent to nearby ships via AIS. Vessel captains can then take immediate action to post a lookout for the animals to avoid hitting them. This provides an added level of right whale protection when combined with the newly instituted speed zones (*see page 4*).



Two months of AIS data illustrate the intense ship traffic through the sanctuary. Credit: SBNMS

Office Status Conferred on National Marine Sanctuaries

On October 1, the National Oceanic and Atmospheric Administration (NOAA) announced the official status of the national marine sanctuaries as an office within the National Ocean Service. Elevation from program to office recognizes the importance of the duties being undertaken by this special part of NOAA. "Our office is an integral part of NOAA's mission and in many ways is the face of NOAA in our communities," said Dan Basta, director of the Office of National Marine Sanctuaries. "Since the elevation process began eight years ago, the Office of National Marine Sanctuaries has become accepted as a world leader in ocean conservation."

Sanctuary Joins Team in Developing Massachusetts Ocean Plan

The Massachusetts Oceans Act of 2008 requires the secretary of energy and environmental affairs to develop a comprehensive ocean management plan by the summer of 2009, with final promulgation of that plan by the end of that year. In an effort to bring knowledge gained from our management plan review and to convey sanctuary interests in the planning process, the sanctuary has become a partner organization.

NOAA Issues Ship Strike Reduction Rule

A large portion of Stellwagen Bank National Marine Sanctuary is now a posted speed zone during special times of the year. A new measure to protect endangered North Atlantic right whales from ship strikes was announced by NOAA on October 8 and went into effect December 9, 2008. The regulation requires large ships to reduce speeds to 10 knots in areas where this endangered species feeds and reproduces, as well as along migratory routes in between. Under the rule, speed restrictions in northern feeding grounds are: Cape Cod Bay (which includes the southwestern part of the sanctuary) from January 1 through May 15; off Race Point (which includes a large portion of the southern half of the sanctuary including the Boston shipping lanes) from March 1 through April 30; and the Great South Channel from April 1 through July 31. Speed restrictions for the southern calving grounds will run from November 15 through April 15, and the mid-Atlantic migratory route is covered from November 1 through April 30. For more information on the rule, visit the NOAA Fisheries Web site at: www.nmfs.noaa.gov/pr/shipstrike.

NOAA Tide Gauge Installed on Sanctuary Pier

A new solar powered tide gauge was installed on the sanctuary pier in Scituate Harbor in November. The instrument demonstrates NOAA's interest in more en-

ergy efficient technologies and uses a laser to more precisely measure tide height. The tidal measurements from this gauge should be of particular interest to local boaters and fishermen, as well as the research community, educators and coastal landowners. To access this information, visit tidesandcurrents.noaa.gov.

Tall Ships to Sail through Stellwagen Bank Sanctuary

Sail Boston, the periodic celebration of tall ships, occurs in 2009 from July 8-13. The tall ships will be taking part in the Atlantic Challenge – a trans-Atlantic Ocean regatta that starts in Vigo, Spain, travels to Tenerife in the Canary Islands, on to Hamilton, Bermuda, Charleston, S.C. and then Boston, Mass. After their Boston stopover, the ships will continue on to Halifax, Nova Scotia and finish in Belfast, Northern Ireland. On their passages to and from Boston, the ships will be sailing through Stellwagen Bank National Marine Sanctuary. For more information on Sail Boston, visit their Web site at www.sailboston.com.

Sanctuary Partners with ROV Competition

This coming year, the New England regional and international Remotely Operated Vehicle (ROV) Competitions will be held at the Massachusetts Maritime Academy, with the Stellwagen Bank sanctuary serving as a co-sponsor and sanctuary staff assisting as judges. The Office of National Marine Sanctuaries has partnered with Marine Advanced Technology Education Center (MATE), organizer of the competition, since the program's inception eight years ago.

Sanctuary Video Released

A new five-minute video that covers sanctuary history, resources, uses and resource conservation threats has been posted on the sanctuary's Web page at stellwagen.noaa.gov. The video incorporates a wide range of images taken from the air, from ships and underwater. Associated with the video is a list of 10 things the public can do to help protect the sanctuary.

President Cites Sanctuary Research at Smithsonian Dedication

When President George W. Bush dedicated the new Sant Ocean Hall at the Smithsonian Institution, an important Stellwagen Bank sanctuary project was publicly recognized. "The great achievement, of course, is this new hall," said the president. "It's built through a partnership between NOAA and the Smithsonian. It's going to introduce visitors to all kinds of interesting things." One of those interesting items is a 45-foot-long replica of a female northern right whale. The model in the museum was inspired by a real whale that had gotten entangled in fishing gear, but worked herself free. She was given the name of "Phoenix" for her ability to rise from adversity. In speaking about

other federal actions to protect whales like her, the president said, "Based on a careful study of where right whales and ships are most likely to collide, we've rerouted the shipping lanes near Boston Harbor. The action reduced the danger to right whales like the Phoenix by nearly 60 percent." That study was initiated and led by the sanctuary's research coordinator Dr. David Wiley, in collaboration with the NOAA Fisheries Service, NOAA Office of General Counsel, several whale research organizations and the U.S. Coast Guard

Sister Sanctuary Whale Watch Workshop

In 2005, a sister sanctuary arrangement was established to protect endangered humpback whales (*Megaptera novaeangliae*) in the North Atlantic. This is the first conservation management action worldwide to protect an endangered migratory marine mammal species on both ends of its range – in its northern feeding and nursery grounds in Stellwagen Bank National Marine Sanctuary and its southern mating and calving grounds in the Marine Mammal Sanctuary of the Dominican Republic. Based on years of sightings, the two sanctuaries share approximately 900 individual humpback whales.

In 2007, a sister sanctuary workshop developed a plan to enhance an ecosystem-based approach to cooperative sanctuary management through capacity building, research, monitoring and education. One action resulting from that plan is a sister sanctuary whale watch Workshop to be held in the Dominican Republic during June 2009. Discussion topics will include best practices for the industry, needed scientific research, and innovative outreach and education, which can improve our understanding of humpback whale migration, habitat use, behavior and human impacts. For more information about the workshop, contact the sanctuary or check our Web site at stellwagen.noaa.gov.

Massasoit Community College Partnership Continues

A special survey course on marine technology and careers, offered by Massasoit Community College's Marine Technology and Technician Series and taught by sanctuary staff for six weeks in September and October, will be offered again this coming fall. The mini-course, offered free of charge, gave perspectives on present trends and future directions in marine research, monitoring and exploration. Staff discussed various career opportunities and levels of training and education needed to successfully enter the job market. Sessions were held at the sanctuary's meeting annex in Scituate. Contact the sanctuary or Massasoit Community College at 508-588-9100 ext. 1509 (phone), www.massasoit.mass.edu (email) for more information.

Harassment

Photos courtesy of Regina Asmutais-Silvia,
Whale and Dolphin Conservation Society



Tuna Gear Hooks Whales Instead of Fish

Every summer, fishermen travel to the sanctuary in search of the big fish; unfortunately they sometimes catch more than they bargained for. Instead of giant bluefin tuna, they have been hooking an even larger animal – the humpback whale, which is an endangered species.

The sanctuary, NOAA's Office for Law Enforcement (OLE) and the National Marine Fisheries Service Northeast Regional Office have been receiving an increasing number of reports of tuna fishing gear hooked on whales and tuna boats trolling through active whale feeding areas. Some of these events have been documented with disturbing photographs. One such incident in 2007 was observed by hundreds of whale watchers, many of whom called the whale disentanglement hotline, overwhelming the system with complaints. In 2008, OLE was notified about 12 incidents, three of which went forward to prosecution.

"With the increase in small to mid-size tuna over the last two years in the sanctuary, I'm not surprised interactions between tuna fishermen and whales are also increasing. I believe the majority of hook-ups are accidental and no one feels more regret than the fisherman himself. That said, I believe more efforts to increase awareness among the tuna fleet fishing the sanctuary are in order," said Barry Gibson, recreational fishing representative on the sanctuary advisory council.

By targeting humpbacks, which feed on the same prey as bluefin tuna (generally schooling sand lance and herring), the fishermen may be placing themselves in jeopardy of prosecution under several laws. All whales, dolphins and porpoises in the sanctuary are federally protected by the Marine Mammal Protection Act, and most large whales in the area are further protected under the Endangered Species Act. Under these acts, it is illegal to "harass, hunt, capture or kill" any marine mammal. Prohibited conduct includes any "negligent or intentional act which results in the disturbing or molesting of marine mammals," such as casting over the back of a whale or trolling through a bubble net or bubble cloud.

Direct violations of the Marine Mammal Protection Act can be assessed maximum penalties of \$20,000 and one year in jail. Tuna boats are not considered fishing vessels with restricted maneuverability, an exemption that can apply to trawlers and gillnetters that enter whale close approach zones.

To decrease the number of incidents of whale harassment and hooking by tuna fishing gear, the sanctuary, OLE and Fisheries will develop an awareness campaign through notices in fishing and boating magazines, bait and tackle shops, and boater education programs. To report fishery law violations seven days a week, 24 hours a day, anywhere in the U.S., call 1-800-853-1964. ■

Tips for Fishing and Boating Near Whales

- See a Spout, Watch Out.
- Avoid Troubles, Steer Clear of Bubbles.
- Don't Chase, Give the Whales Space.

For more tips and additional information, visit the sanctuary's See A Spout education page on our Web site at stellwagen.noaa.gov/education.

Tag Team Update



Sanctuary researcher Michael Thompson observes feeding humpback whales during a tagging mission.

With 16 tagged whales and 97 hours of data, 2008 turned out to be a very successful year for the whale tagging project. To accomplish these achievements, the sanctuary led an impressive slate of research partners, including Duke, Harvard, Penn State, University of New Hampshire, Whale Center of New England, Woods Hole Oceanographic Institution and the National Marine Fisheries Service. Each group aided sanctuary scientists by providing specialized technical expertise, from tag engineering to software programming and whale identification.

Using the NOAA Ship *Nancy Foster* as the mother ship allowed the sanctuary's 50-foot research vessel *Auk* to dedicate its time to mapping schools of prey fish in proximity to the tagged whales. In addition the *Auk* was used as support for the tag boats, which are inflatables able to make close approaches to the individual whales.

"One of this year's special accomplishments was tagging multiple animals in the same foraging group to investigate cooperative feeding," said Dr. David Wiley, the sanctuary's research coordinator and lead scientist for the project. The team was able to apply tags to two sets of paired whales – Colt and Isthmus, as well as Falcon and Hancock. Scientists will be studying the underwater tracks

and vocalizations of these whales to better understand how whales work together to catch prey.

"One other fact that became glaringly apparent is that our whales spend about 60% of their time in the zone that would make them vulnerable to ship strikes," noted Wiley. The researchers find that the greatest dangers are in the top 15 meters (50 feet).

A related whale research project includes the installation of an array of acoustic buoys, or listening posts, that span the sanctuary. Every three months the pop-up buoys are swapped out and the data downloaded. This archive of natural and man-made noises may also assist scientists to better understand whale behavior and help managers develop appropriate conservation measures. "Our ultimate goal is to tag whales within our acoustic array and see if these linked data sets can give us a more complete picture of how whales react to noise in their environment," said Wiley.

Media interest in the sanctuary's research program continues to grow, with a number of newspapers covering the story. Two prominent conservation journals recently used photos from sanctuary research projects on their covers. During the first week of February 2009, National Geographic's "Wild Chronicles" television series will air an episode focused on the tagging project (check local PBS listings for days and time). ■



NOAA Ship Nancy Foster served as the base of operations during the tagging research project. All photos on this page taken under NOAA Fisheries Permit #775-1875. Photo Credits: SBNMS



A non-invasive suction cup tag is placed on a humpback whale.

Whales Tagged in 2008

Humpbacks

- Cajun
- Cardhu
- Colt
- Etch-A-Sketch
- Falcon
- Hancock
- Isthmus
- Lavalier
- Milkweed
- Moray
- Nile
- Pepper
- Perseid
- Tectonic
- Venom

One Unnamed Fin Whale

The Whale Watcher

Credit: SBMMS

Albert Avellar, Father of East Coast Whale Watching



Credit: Avellar family and Provincetown Banner

This story was researched and written by students of the Boston University Graduate Program in Science Journalism and sanctuary staff.



His shaven head, stern eyes and barrel chest made him a perfect stereotype of a sailor and captain, and his ready laughter and unassuming manner made him an amiable host for passengers on his vessel. From the young age of 17- when he bought his first sailing vessel- to well into his 70s, Al Avellar relied on the ocean to earn a living. On November 3, 2008, at the age of 90, the father of East Coast whale watching passed away, leaving a family and a company that continue the traditions he established.

"I grew up in Provincetown right here on Cape Cod. I grew up during a tough period of the Depression, and I didn't have a college education. I graduated from high school without work and ended up being self-employed in the boating business," said Avellar, the man responsible for founding East Coast whale watching and owner of one of the most successful whale watching businesses on Cape Cod.

Before starting his whale watching company in 1975, Avellar owned a small sports fishing operation in Provincetown, Mass. Even then, avid sports fishermen would take pause to gander at a passing whale. Yet, Avellar knew that frugal tourists in the 1960s would not pay for a ticket to see whales swimming by, since

few people even realized there were whales in these waters.

"During the fishing trips, my passengers would get all excited to see a whale," Avellar remembered during an interview with a sanctuary intern a few years ago. "And when they got off the boat, they would say, 'Thanks captain for showing us that whale.' But they would never buy a ticket to see a whale; it was just a bonus." According to Avellar, the knowledge of the proximity of whales did not attract tourists at first, but what sparked interest was the growth of environmental consciousness.

"It was in 1974 that you first started reading about the rivers being dirty, about pollution, about how horrible the environment was and what a heck of a mess we were in. People are becoming what I call mini-environmentalists," Avellar said, "and they were becoming aware of possible future extinctions, including whales. I said to myself, 'Geez, what a time to go. I've got the boat to do it, and it won't cost me a nickel.' I wanted to save whales."

Whale watching actually began as right whale watching, Avellar said. The right whale can reach a length of over 50 feet and a weight of 50-70 tons, looking somewhat like a legless

hippopotamus with a severe case of acne. From the 1400s (and the early Basque whalers), these marine mammals were mercilessly hunted until the 1930s, when the international community banned the killing of this species. But, despite years of protection, the population still stands at just under 400 individuals, and their struggle is far from over. With a slow reproductive rate and a susceptibility to human-caused mortality due to ship strikes and entanglement in fixed fishing gear, scientists fear that the population is growing slowly, if at all. Vessels, including whale watching boats, are restricted under federal and Massachusetts law from approaching within 500 yards of a right whale, which, incidentally, does not provide much of a view. But in the early days, Avellar said, it was this rare whale that people most wished to see on a whale watch.

"People wanted to see the right whales, but there were so few of them. But we did find plenty of finback whales. We always saw finners. I'd want to say the finback whale is the 'right' whale. When you're in the business we are, believe me, we're so thankful to see any whale. So I could very easily understand why the finback whale was the 'right' whale if there're no right whales out there," Avellar said with a roaring guffaw. "But I never did that."

continued on page 8

continued from page 7

On April 15, 1975, Avellar, along with marine biologist Charles “Stormy” Mayo from the Provincetown Center for Coastal Studies, left Provincetown port with his first group of whale watchers, a boatload of school children. Worried that he would not find any whales, he offered a case of beer as reward to any boater or fisherman who told him the location of a whale. A half-mile out of port, he immediately spotted a 60-foot finback whale named Oscar.

After an unbearably long three hours of following Oscar, a thirsty fisherman informed him of a number of right whales on the southwest corner of Stellwagen Bank. “We got out there, and to this day I claim that there were 60 right whales,” Avellar said. His first official whale watch was an unqualified success.

“At the beginning I only did it for a month, from the 15th of April to the 15th of May. I was trying to save whales; I wasn’t trying to make money. My boat wasn’t doing anything else, so that was the perfect time to take people out whale watching. And then, after a while, I saw that we could try to save the whales and make money doing it, too.”

Even though Avellar recognized that whale watching could develop into a business, he still had an obstacle to overcome: a skeptical public doubted his ability to find a nearly extinct whale in the expansive ocean.

Avellar recalled: “Some guy read an article about us in the newspaper and called one of the museums here in Massachusetts. He asked, ‘What’s this about some boat down there on the Cape that will take you whale watching. Is it some kind of scam?’ The people at the museum said, ‘There aren’t any whales in Cape Cod Bay.’

“Well this guy, fortunately, didn’t stop there. He wasn’t so sure that these guys knew what they were talking about. So, he calls Woods Hole and talked to Bill Watkins. And that’s why I know the story at all, because Bill informed me. Bill told him, ‘Of course there are. We take the boat one day a week for research, and there are whales in Cape Cod Bay. This guy’s doing a heck of a service.’ [Editor’s note: William Watkins, oceanographer emeritus at the Woods Hole Oceanographic Institution, was a world-renowned specialist in marine mammal bioacoustics who passed away at the age of 78 in 2004. He was one of Avellar’s early whale watch charter customers.] So the guy, whoever it was, probably came on the boat.

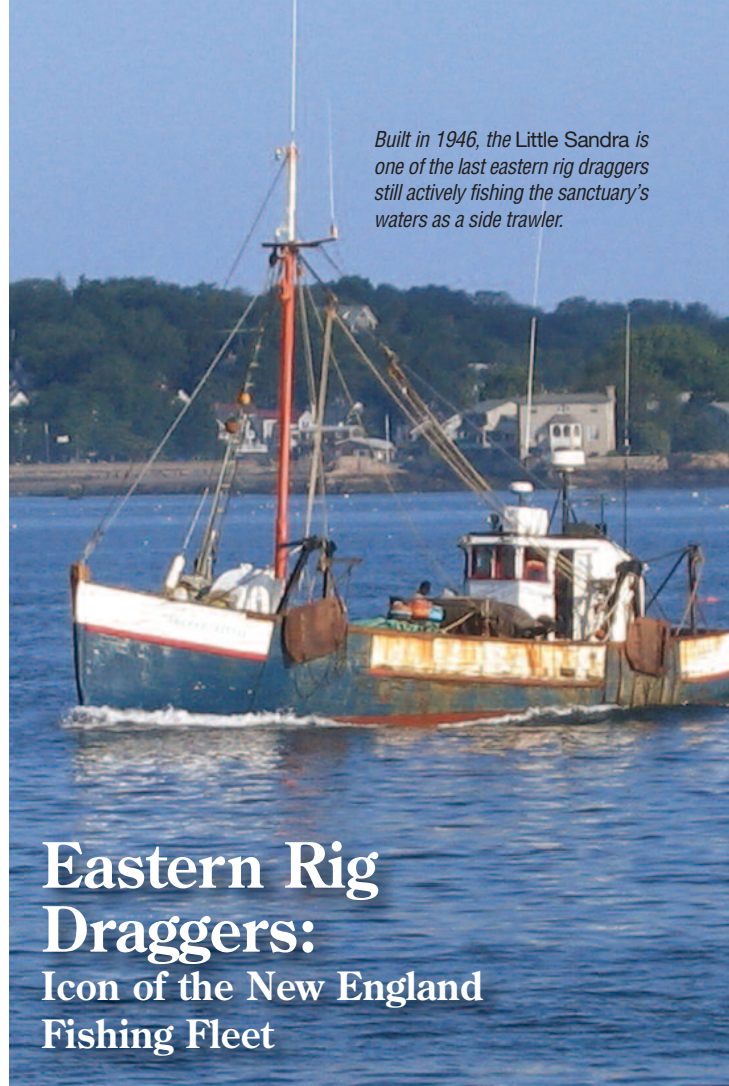
“And you know what happens before that season is out?” Avellar asked with an ear-to-ear grin. “That museum began going out with me on trips! They got together a group and chartered my boat each season during those first few years.”

Avellar’s company, called the Dolphin Fleet of Provincetown, has expanded to three boats, specially designed for whale watching, and has recorded its 33rd anniversary in the business. His son Aaron Avellar ran the company for several years until his passing in 2000, and his stepson Steve Milliken, a sanctuary council member, is now the owner/operator. Over 150,000 people go on these whale watching tours every year along with numerous whale researchers who have been allowed to use these vessels for their observations. This year, the Dolphin Fleet hosted interns from the Marine Mammal Sanctuary of the Dominican Republic, the sister sanctuary to Stellwagen Bank.

Commercially, whale watching has succeeded as an economic venture in Massachusetts, but it has done more than that. Avellar and the Dolphin Fleet set a trend of educating the public about whales, and the industry he sparked has engendered broad public support for efforts to preserve and protect these great creatures.

“From the standpoint of sensitizing people to the fact that these are wonderful animals, in that sense, whale watching has helped to save the whale,” noted Bill Watkins from his Woods Hole office several years ago. The millions of passengers over the years who have been able to meet these leviathans up close have become a strong voice for marine conservation efforts, including work that led to the designation of Stellwagen Bank National Marine Sanctuary. ■

Built in 1946, the Little Sandra is one of the last eastern rig draggers still actively fishing the sanctuary’s waters as a side trawler.



Eastern Rig Draggers: Icon of the New England Fishing Fleet

The colonization and growth of North America was made possible, in part, by the success of the fishing industry and the stalwart individuals who toiled at sea. New England fishermen embodied the resourcefulness, self-assurance and tenacity of the New World, developing a cultural identity that remains today. Fishermen and their vessels have become American icons – symbols of national pride over 300 years. The simple shallops of the Pilgrims segued into the fishing schooners that plied the Grand Banks and Georges Bank. However, the last 100-years saw the greatest change in fishing technology since Europeans arrived on the North American continent.

As the American fishing schooner reached its zenith during the first decades of the twentieth century, technological advances in gasoline and diesel engines remade New England’s fisheries. The modification of wind-powered schooners into engine-powered vessels occurred quickly between 1910 and 1930. Likewise, the introduction of the otter trawl to New England revolutionized fishing practices. Ultimately, the packaging of these technologies into the cost effective eastern rig dragger exponentially increased its impact.

The first eastern rig draggers were hybrid vessels that incorporated the advancing technology into older hull forms. Ever frugal, many New England fishermen adapted their dory trawling schooners to otter trawl technology. As opportunity arose, fishermen purchased vessels that had been specifically designed for the new technology – true eastern rig draggers. This new vessel constituted a compromise between speed, cargo capacity, seaworthiness and towing power. As the hull form,

Maritime Heritage

power plant, fishing machinery and electronics were refined, eastern rig draggers became increasingly durable and seaworthy, resulting in greater vessel efficiency and crew safety.

The eastern rig dragger is categorized as a wooden-hulled, engine-powered fishing vessel that deploys, tows and recovers an otter trawl net or dredge over the starboard or port side. A single structure at the vessel's stern contains the wheelhouse, captain's bunk and below deck engineering space. The vessel's trawl winch is positioned between the wheelhouse and the fish hold hatch at amidships.

Once the concept of the eastern rig dragger took hold in New England, naval architects and shipbuilders began a process of refining the vessels and scaling them to the desires of their owners. This process resulted in draggers that ranged in size from 40 feet to 120 feet long with various bow and stern designs. Dragger design was plain, practical and functional. New England's centers of eastern rig dragger construction were Essex County, Mass., and mid-coast Maine, with building sites found in well established shipyards and in fishermen's backyards. The most prolific builders were Harvey F. Gamage of Bristol, Maine; Newbert and Wallace of Thomaston, Maine; and Dana Story of Essex, Mass. Historical records indicate that over 500 wooden eastern rig draggers were built or converted from schooners in New England between 1919 and 1984.

The eastern rig dragger played a critical role in demonstrating the efficiency and efficacy of the diesel engine and otter trawl. Eastern rig draggers from ports surrounding the sanctuary such as Provincetown, Boston and Gloucester supplied a bulk product that revolutionized how Americans purchased fish. The industrialization of fishing facilitated by the increased efficiency of the eastern rig dragger led to factory-style processing and packaging of a food that had previously been handled by fishmongers and their customers on a decentralized basis.

Today, approximately 14 eastern rig draggers are still actively fishing or afloat in New England. In nearly all cases, the fishing permits associated with the draggers have greater monetary value than the vessels themselves. As these aged vessels sink or are scrapped, New England loses a part of its cultural heritage. Currently, the *Evelina M. Goulart* at the Essex Shipbuilding Museum and the *Roann* at Mystic Seaport are the only eastern rig draggers held in museum collections.

Archaeologists have located and investigated four eastern rig dragger shipwrecks in Stellwagen Bank National Marine Sanctuary. Preservation status varies between sites, with one vessel almost completely intact and sit-

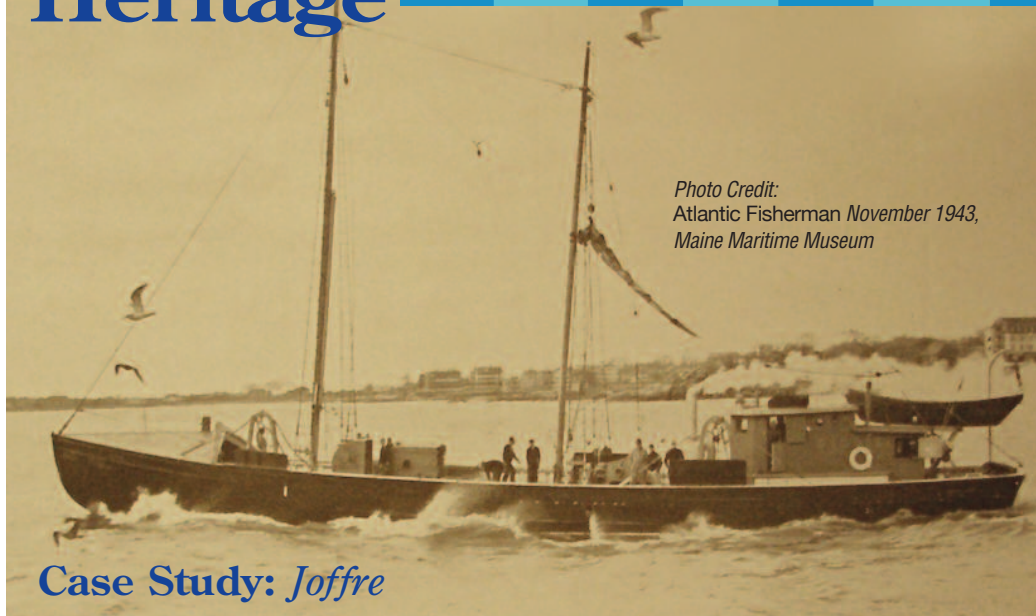


Photo Credit:
Atlantic Fisherman November 1943,
Maine Maritime Museum

Case Study: *Joffre*

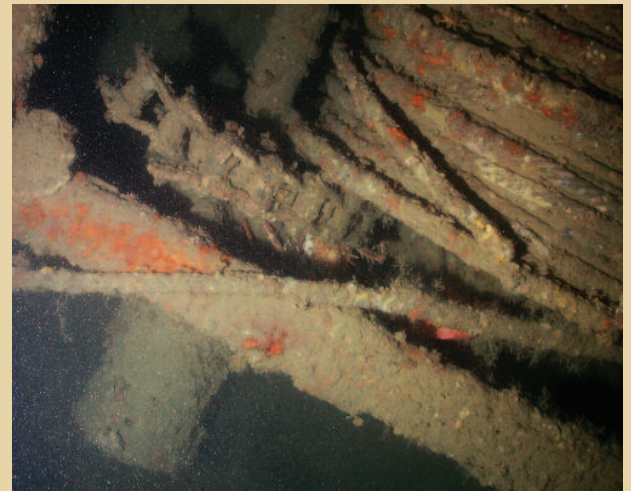
When sanctuary archaeologists investigated a shipwreck with the National Undersea Research Center at the University of Connecticut, they found the lower hull structure of an approximately 100-foot-long wooden vessel. A large trawl winch and gallows frames indicated that the vessel was an eastern rig dragger. At the stern of the vessel connected to its propeller shaft was a large eight-cylinder Fairbanks-Morse model diesel engine. Archaeologists compared the observed features and location of the archaeological site to the historical record and determined that the vessel was likely the *Joffre*, designed by renowned naval architect Thomas F. McManus.

Arthur D. Story of Essex, Mass. launched the auxiliary fishing schooner *Joffre* in 1918. Originally built for the mackerel seine fishery, the *Joffre* spent most of its working life dory trawling for haddock and halibut. In 1939, its new captain, Simon Theriault, converted the 105-foot-long *Joffre* into an eastern rig dragger to participate in the rapidly developing Acadian redfish fishery.

After a routine 10-day fishing trip to the offshore banks of Nova Scotia, the *Joffre's* engine caught fire as it was returning to Gloucester, Mass., on August 9, 1947. The fire quickly engulfed the wheelhouse and engine spaces forcing the 10-man crew to abandon ship into dories. Despite efforts to quench the blaze and tow the vessel to port, the *Joffre* sank the next morning.

During its 29-year career, the *Joffre's* crews landed over 15 million pounds of fish. The vessel serves as an archetypal example of the transition from sail to diesel power and the mechanization of the industry. Individuals interested in walking the decks of a vessel similar to the *Joffre* can visit the schooner *L. A. Dunton* at Mystic Seaport in Mystic, Conn. Arthur D. Story built the *L. A. Dunton* in 1921 using the *Joffre's* plans.

The *Joffre* was listed on the National Register of Historic Places on January 16, 2009.



The end of the Joffre's trawl winch has a gypsy head, which was used to help handle the lines. Credit: NOAA/SBNMS and NURC-UConn

ting upright on the seafloor, and another existing as fragments of lower hull and durable machinery. The shipwrecks encompass the variety of sizes and hull styles that developed

over the decades. Historically reported vessel losses in Massachusetts Bay indicate that over fifty eastern rig draggers sank within the sanctuary or its immediate vicinity. ■

Marine Debris

Fishermen Target an Unlikely Catch



Frank Mirarchi (left) and Ben Cowie-Haskell view derelict gear collected from the sanctuary. Credit: SBNMS.

There's an unlikely catch being targeted by fishermen in the sanctuary lately - marine debris, particularly derelict fishing gear. A deck full of battered lobster pots or tangled netting may not hold the cachet or economic value of a school of cod or a giant bluefin tuna, but these catches are significant. By removing marine debris, fishermen are "greening" our blue ocean world and making the sanctuary a safer place for marine life, fishermen and other individuals who use these waters.

Several marine debris programs are now underway in and around the sanctuary. The sanctuary's Sea Debris Initiative had its origins in 2007, when a Scituate fisherman, Frank Mirarchi, enlisted the sanctuary to help with the problem of retrieval of ghost fishing gear. Cutting away the debris took valuable time away from limited fishing hours, and, to make matters worse, there was nowhere to dispose of the debris, other than throwing it back into the water, creating a potential hazard for other fishermen and marine life.

With funding from NOAA's Marine Debris Program, sanctuary deputy superintendent Ben Cowie-Haskell initiated a pilot project that reimburses commercial fishermen for their time in retrieving ghost gear and arranges for its disposal on shore. "This was a win-win situation for all parties," said Cowie-Haskell. "Not

only is the sanctuary being cleaned up, but participating fishermen are reducing their risk of lost fishing time or injury from derelict fishing gear."

The Sea Debris Initiative is now active in Scituate and Provincetown, with fisherman Dave Haley serving as the Scituate coordinator of the project and Owen Nichols of the Provincetown Center for Coastal Studies filling the coordinator role in his town. Commercial fishermen Frank Mirarchi of Scituate and Louis Ribas of Provincetown are participating in the on-the-water marine debris removal efforts.

Converging with the sanctuary's efforts was a recycling effort developed by Covanta Energy Corp. entitled "Fishing for Energy." The company, in partnership with NOAA, the National Fish and Wildlife Foundation and Schnitzer Steel Industries, provides cost-free dumpsters at key fishing ports.

On October 24, the project partners dedicated the newest recycling bin to the network on Provincetown's MacMillan Wharf. Seven other sites have been established by Covanta, including Scituate and New Bedford. The old, derelict or unusable fishing gear deposited in these dumpsters is taken to the Schnitzer Steel facility in Johnston, R.I., where it is shredded and then transported to Covanta's electricity-producing SEMASS Energy-from-Waste facility in Wareham, Mass. "This dumpster is absolutely critical to breaking that trend of throwing gear overboard," said Cowie-Haskell at the dumpster installation in Provincetown. "Old fishing gear doesn't have to be a problem, it can now be converted into energy." ■

Cod swim in and around derelict fishing gear which threatens sea life for years. Credit: SBNMS

Sanctuary Sweep

Stellwagen Sweep is a two year effort to reduce the amount of marine debris in the sanctuary. The cooperative effort, organized by Stellwagen Alive, Friends of the National Marine Sanctuary, enlists the efforts of the commercial fishing community, the Gloucester Harbormaster and Department of Public Works, the Mass. Division of Marine Fisheries and the National Fish and Wildlife Foundation. For more information, visit www.stellwagenalive.org



Fishermen can now deposit derelict gear in a Covanta recycling bin on Provincetown's MacMillan Wharf. Credit: SBNMS

MSI: *Mola mola*

(MARINE SCIENCE INVESTIGATION)

Article contributed
by Carol "Krill" Carson, NECWA

This fall, three dead ocean sunfish were found on Cape Cod area beaches. The carcasses that washed ashore were intact, but two ocean sunfish had cuts through their dorsal fin and one of these animals also had body lacerations, indicating possible vessel collision or fishing entanglement. Researchers undertook necropsies, the animal version of human autopsies, to determine the cause of death in each case and to learn more about these mysterious fish, which can occasionally be observed drifting in the surface waters of Stellwagen Bank National Marine Sanctuary.

Credit: SBMMS

Very little is known about the ocean sunfish (scientific name *Mola mola*), even though it is the heaviest bony fish in the world (with a top weight of one ton). Typically, ocean sunfish that strand along the New England coast measure six to seven feet in length and weigh close to 700 pounds. Although this species of fish prefers tropical or temperate waters, it migrates into our cold and productive waters in the summer and fall to feed on jellyfish, ctenophores and other gelatinous animals. But, just like our local sea turtles, ocean sunfish begin to strand (found dead or dying on shore) once the water temperature drops below 50 degrees F.

The ocean sunfish's unusual appearance makes it easy to recognize. One large dorsal fin and one large anal fin protrude from a round, laterally flattened body. It has what appears to be a shortened or truncated caudal (or tail) fin, but scientists have discovered that the ocean sunfish tail is really an extension of the dorsal and anal fins. This structure is called the clavus, and it appears to serve as a rudder. The dorsal and anal fins provide most of the propulsion.

Observations in Stellwagen Bank National Marine Sanctuary and elsewhere along the New England coast indicate that this fish spends a lot of time on its side at the surface, often drifting with the currents. This body placement exposes the greatest amount of surface area to the sun, possibly serving as a warming mechanism ("thermal

recharging") in a cold-water environment, but also may make the animals more susceptible to being struck by boats. The large, sail-like dorsal fin rises up out of the water in a skulling motion, helping the animal move slowly along the surface. In some sightings, ocean sunfish have appeared to become more alert when boats approached, righting themselves and even swimming over to investigate the newcomers. Sanctuary divers became the study subjects of an ocean sunfish on Stellwagen Bank. Despite their ungainly appearance, these animals are good swimmers, and some have been observed breaching or jumping out of the water.

In addition to the damages noted in this article's introduction, the necropsies revealed the following findings. The first of the fall ocean sunfish necropsies was performed on a female that stranded at Linnell Landing in Brewster. This fish was close to seven feet in length and appeared to be in good health as very few internal parasites were found and the skin was over five centimeters thick. A thin layer of rough, dark gray skin sits on top of a thick layer of connective tissue that wraps around the entire body of the animal, encasing the internal organs and the muscle tissue. One of the necropsy attendants likened it to a coconut.

The Sagamore Beach stranding was also a female. An interesting observation from both of the female specimens was that each had only one ovary. Most fish have two go-

Ocean Sunfish Fast Facts

Common Name: Ocean sunfish

Scientific Name: *Mola mola*

Predators: sharks, bluefin tuna (orcas and sea lions in the Pacific)

Prey: jellyfish, ctenophores, other gelatinous zooplankton; secondary prey includes squid, sponges, sea stars, eel grass, crustaceans, larval fish

Size: 6 to 7 feet

Weight: 700 lbs. (1 ton max)

nads – testes or ovaries, based on the animal's sex. Unusual parasites were collected from this animal's gills.

The third necropsy occurred at Lieutenant's Island in Wellfleet. This animal was almost six feet in length and its sex was determined to be male. Its condition was poor due to its prolonged exposure to the elements (possibly several weeks).

The death of any ocean sunfish is an unfortunate event, but from adversity comes the opportunity to better study these animals. Necropsies allow scientists to collect tissue and skin samples that can be used for future analysis. The public is asked to report sightings of live or dead ocean sunfish to NEB-Shark, the New England Basking Shark Project. NEBShark is a community-sighting network for both ocean sunfish and basking sharks. Go to the NEBShark Web site at www.nebshark.org to learn more about the program and how you can help in the study of these amazing marine fish. ■

Colleen Farr
Upper Cape Cod Reg/Tech HS
First Place Grades 9-12

2009 Marine Art Contest

Grades K-12

Deadline: April 1, 2009

Theme: Amazing Ocean Creatures of
Stellwagen Bank National Marine
Sanctuary and the Gulf of Maine

Emma C.
Brown School
First Place
Grades 5-8



Kate L.
Southbrook Academy
First Place Grades K-4

Sponsors:

Massachusetts
Marine Educators
Stellwagen Bank
National Marine
Sanctuary
New England
Aquarium
Stellwagen Alive
Whale and Dolphin
Conservation Society



**Divisions: K-4, 5-8, 9-12,
Scientific Illustration,
Computer Graphics**



Jason Ochoa
Falmouth High School
First Place Graphic Arts

Winners from previous marine art contests are pictured here.

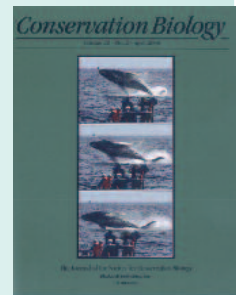
For more information, visit the sanctuary Web site at
stellwagen.noaa.gov or contact anne.smraina@noaa.gov
or call 781-545-8026 ext. 204.

Sanctuary Highlighted in Prestigious Journals

Dr. Leila Hatch, the sanctuary's ocean acoustics specialist, was the lead author for "Characterizing the Relative Contributions of Large Vessels to Total Ocean Noise Fields: A Case Study Using the Gerry E. Studds Stellwagen Bank National Marine Sanctuary," the cover profile story for the November 2008 issue of *Environmental Management* (Volume 42, No. 5). Sanctuary scientists Michael Thompson and Dr. David Wiley were among the seven co-authors on the article, along with staff from NOAA's Northeast Fisheries Science Center, Cornell University and the University of New Hampshire. The journal's cover photo shows humpback whales near a large tanker traveling along the shipping lanes that pass through the sanctuary. The authors concluded in their paper that noise produced by large commercial vessels was at levels and within frequencies that warrant concern among managers regarding the ability of endangered whales to maintain acoustic contact within greater sanctuary waters. The research made use of a system of autonomous recording units in the sanctuary and the U.S. Coast Guard's Automatic Identification System to simultaneously track ship movements.



The journal *Conservation Biology* bestowed a similar honor on another research paper by the sanctuary's science team. This series of three photographs of a breaching whale and the whale tagging team in the sanctuary filled the cover of the summer 2008 issue (Volume 22, No. 2). The issue featured a contributed paper entitled, "Effectiveness of Voluntary Conservation Agreements: Case Study of Endangered Whales and Commercial Whale Watching." Lead author of that paper was sanctuary research coordinator Dr. David Wiley; co-authors represented NOAA's Northeast Fisheries Science Center and International Fund for Animal Welfare. The paper reviewed established whale watching guidelines developed by a government-research-industry consortium, and how actual in-the-field operations indicate a high degree of non-compliance with these voluntary approaches to conservation goals.



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